



AF/ CW  
1742

Docket No.: M1071.1711  
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Hidekiyo Takaoka et al.

Application No.: 10/087,742

Confirmation No.: 7012

Filed: March 5, 2002

Art Unit: 1742

For: LEAD FREE SOLDER AND SOLDERED  
ARTICLE

Examiner: S. Ip

**REPLY BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This short reply is submitted in response to the Examiner's Answer mailed July 22, 2005.

The present invention is based on the discovery that by appropriately limiting the elemental composition and amounts of the elements employed of a lead-free solder, resistance to conductor leeching upon soldering or upon heat aging after soldering can be realized and the resulting electronic devices and parts have their characteristics deteriorated to a lesser degree.

The claims on appeal relate to one of three disclosed lead free solders, namely, the one "consisting essentially of" at least one member of the group of 0.1-1% (preferably 0.4-0.5%) cobalt, 0.01-0.2% (preferably 0.05-0.1%) of iron, 0.01 to 0.2%

(preferably 0.05-0.1%) of manganese and 0.01-0.2% (preferably 0.4-0.6%) of palladium; 0.5 to 1% of copper and at least 90.5% of tin. The appealed claims also relate to a soldered article containing a transition metal conductor joined through the solder.

### **The Rejection Based on JP '090**

JP '090 teaches a solder composition containing Sn, 1-15 wt. % Bi and/or 1-15 wt. In, and 0.1-2.5 wt. % Cu, and optionally may contain 0.01-2 wt.% of one or more of 6 elements which include Ni and Fe. The reference states in paragraph [0013] that use of less than 1 wt.% bismuth and/or indium is not effective. The reference thus teaches away from any composition containing less than 1% of bismuth and/or indium.

The claims on appeal are "consisting essentially of" claims and it has been stated that this language excludes the presence of bismuth and/or indium. The Examiner's Answer disagrees on the grounds that the applicant has the burden of showing that the basic and novel characteristic of the composition is materially affected by these elements. However, the Examiner's Answer's requirement that the applicant has a burden to prove what JP '090 explicitly states is true exalts form over substance. The statement in the reference not being challenged. It is respectfully submitted that once the reference states that the bismuth and/or indium effects a basic characteristic of the composition, whatever burden may have been on the applicant has been satisfied.

The Examiner's Answer also states that the instant specification indicates in the passage bridging pages 8 and 9 that bismuth would not materially change the characteristics of the composition. Beyond the response in the Appeal Brief, it is respectfully pointed out that the paragraph to which the Examiner has referred concerns the possibility that "incidental impurities" maybe present. JP '090 teaches a minimum amount of bismuth is 1% is required, and a quantity of bismuth this high

hardly qualifies as an “incidental impurity”. The passage in the specification does not negate the fact that the “consisting essentially of” claim language excludes the presence of the amount of bismuth which the JP ‘090 reference teaches is essential.

With reference to section VI (2) of the Appeal Brief, the Examiner’s Answer calls attention to paragraph [0002] in JP ‘090 which indicates that the solder is intended “for soldering of electronics equipment”. The Examiner’s Answer then continues with the statement that electronic equipment “is known to contain Cu/Cu alloyed printed circuit on generic circuit board.” Beyond the fact that there is no factual basis identified for this contention, and to the extent it may be true that some “electronics equipment” may “contain” copper printed circuits, the contention would still constitute a hindsight selection of conductors. Further, the dependent claims about which this assertion is made refer to a transition metal conductor liable to spread in molten tin. The Examiner has not even attempted to satisfy the requirement that the conductor is liable to spread in molten tin.

### **The Rejection Based on Carey**

The Examiner’s Answer asserts that the transitional phrase “consisting essentially of” does not exclude any element disclosed by Carey and therefore reliance on the *Baird* case in the Appeal Brief is misplaced. However, the Appeal Brief arguments about Carey do not concern the “consisting essentially of” language, but rather are based on the position that the Examiner has never established a *prima facie* basis for rejection.

As shown in the Appeal Brief, the Carey disclosure includes tens of millions, if not hundreds of millions, of compositions. The Examiner’s Answer advances the proposition on page 8 that a disclosed genus renders all “species *prima facie* obvious”

citing the *Raychem* and *Merck* cases. But the *Raychem* case does not support this proposition, and the Federal Circuit explicitly stated “*we decline to extract from Merck the rule that the solicitor appears to suggest -- that regardless of how broad a disclosure of a chemical genus renders obvious any species that happens to fall within it*”, *In re Jones*, 959 F2d 347, 350, 21 USPQ2d 1941, 1943 (1992); Accord, *In re Baird*, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994).

The *Woodruff*, *Merck* and *Susi* cases cited by the Examiner involved situations where the genus covered only a handful of possibilities. That precedent has no applicability to situations, such as that here, where the genus covers many millions of combinations.

It is well established that a shotgun disclosure is insufficient to render an invention obvious. Carey is a shotgun disclosure, and the Examiner’s Answer does not even attempt to contend otherwise.

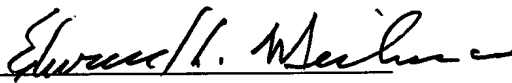
Carey’s disclosure of many millions of possibilities is, at the very best, an invitation to experiment, without any disclosure which suggests the lead free tin solder claimed in this application. There is clearly no motivation to manipulate the Carey disclosure to realize the claimed solder. There is no teaching or suggestion or guidance about which elements to select and which to ignore, or how to adjust concentrations to realize resistance to conductor leeching upon soldering or upon heat aging after soldering so that the resulting electronic devices and parts have their characteristics deteriorated to a lesser degree. Clearly, Carey does not render the claimed invention obvious.

**Conclusion**

For the reasons set forth in the Appeal Brief and this Reply Brief, it is respectfully submitted that the rejection of the instant application is untenable and reversal of the Examiner's final rejection is respectfully solicited.

Dated: August 1, 2005

Respectfully submitted,

By 

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